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Fighting Invasive Plants in West Virginia

This brochure describes 11 of the most invasive non-native plant species found in West Virginia with information about their appearance, habitat, how they threaten native communities, possible controls, and native species which can be used as alternatives in gardens or wildlife plantings.



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What are Invasive Plants?

Of the approximately 2,500 species of plants known to occur in the wild in West Virginia, about 72 percent are native or occurred in West Virginia before the time of substantial European settlement. The other 28 percent, over 700 species, are not native to West Virginia, having been introduced from other states or countries. Non-native plants have been introduced for erosion control, horticulture, forage crops, medicinal use, and wildlife foods. They have also been introduced simply by accident. Most of these species never stray far from where they are introduced (gardens, urban areas, agricultural fields), yet some become very invasive and displace native plants in woodlands, wetlands, and other natural areas. These non-native invasive species are one of the greatest threats to the natural ecosystems of West Virginia.

Many plants considered non-native, alien, or exotic are popular, aesthetically pleasing species. Yet, it is important to look beyond these traits to see how these plants “act” in the landscape. Sometimes we plant invasive non-native plants for landscaping or wildlife habitat without realizing the problems they may cause when

they escape into natural areas. Without natural predators or controls, non-native invasive plants are able to spread quickly. They often create monocultures that force out native species. Native spring wildflowers, for example, are quickly displaced by garlic mustard and invasive bush honeysuckle species. A diverse, healthy ecosystem is important for clean air and water, soil stability, and food and shelter for wildlife.

This brochure describes 11 of the most invasive non-native plant species in West Virginia with information about their appearance, habitat, possible controls, and native species which can be used as alternatives in garden or wildlife plantings. Although people play a major role in spreading invasive species, we can also help control them. Together, we can save our favorite places. Managing these invasive species is difficult and complex; be sure to obtain more detailed information before using controls, such as herbicides.

For more information visit
www.phcwpma.org

Autumn-olive

Elaeagnus umbellata

Description

Autumn-olive is a fast-growing shrub or small tree reaching up to 20 feet in height. Leaves are small and oval, dark green on the upper surface and silvery below. Small coppery dots occur on stems and leaves. This shrub has light yellow, highly aromatic flowers and produces large quantities of small, round, red fruits that are readily eaten and spread by birds.

Habitat

Autumn-olive can survive in very poor soils because of its nitrogen-fixing root nodules. This shrub grows in disturbed areas, roadsides, pastures, and fields throughout West Virginia.

Ecological Threat

Autumn-olive can outcompete native vegetation and interfere with natural plant succession. Because this shrub is capable of fixing nitrogen in its roots, it can grow on bare, mineral substrates. Although autumn-olive provides a plentiful source of edible fruits for birds, the nutrient content of these fruits is low.

Management

Stems may be cut and treated with systemic herbicide. Resprouting will occur, so follow-up control is necessary. A combination of hand-pulling, digging, and herbicide treatments is usually necessary. Foliar treatments using dicamba, 2,4-D, glyphosate, metsulfuron methyl, and triclopyr have proven effective in controlling autumn olive. Herbicide applications for larger shrubs include cut-stump treatments, dormant season basal bark, and hack-and-squirt methods. For cut stump treatments, brush or spray concentrated glyphosate or triclopyr onto freshly cut stumps. For dormant season basal bark treatments, apply triclopyr in crop oil in a band completely around the stem (no skips) at a height of 12 to 18 inches. The hack-and-squirt method involves making cuts around the stem and squirting concentrated herbicide onto the cambium (inner bark).

Native Alternatives

Black haw (*Viburnum prunifolium*), dogwoods (*Cornus racemosa*, *C. amomum*), paw-paw (*Asimina triloba*), and spicebush (*Lindera benzoin*)

What You Can Do To Help

- Start an invasive species control program on your property!



Bush Honeysuckles

Lonicera maackii, *L. tatarica*, *L. morrowii*,
Amur, *Tatarian*, and *Morrow honeysuckle*

Description

These upright shrubs can grow 6-15 feet in height. Each has dark green, egg-shaped leaves which are opposite along the stem. Older stems are often hollow (unlike our native honeysuckles which have solid stems). The tubular flowers are white on the Amur and the Morrow (changing to yellow with age), and pink on the Tatarian honeysuckle. Berries range from red to orange, occasionally yellow, and are eaten and dispersed by birds.

Habitat

The bush honeysuckles inhabit abandoned fields, roadsides, woodlands, and edges of marshes. Morrow's honeysuckle has the greatest habitat breadth and is capable of invading bogs, fens, lakeshores, and other uncommon habitat types.

Ecological Threat

Exotic bush honeysuckles can rapidly take over a site, forming a dense shrub layer that crowds and shades out native plants. The fruits of exotic bush honeysuckles, while abundant and rich in carbohydrates, do not offer migrating birds the high-fat, nutrient-rich food sources needed for long flights, such as those that are supplied by native plant species.

Management

The best control method is to cut and treat stumps with systemic herbicide, such as glyphosate or metsulfuron methyl. Sprouts from cut stems may be treated with a foliar application of these systemic herbicides. Young shrubs are easy to pull or dig up. Be aware there is a native bush honeysuckle (*Lonicera canadensis*) in West Virginia, so proper identification is necessary.

Native Alternatives

Chokeberry (*Aronia prunifolia*, *A. melanocarpa*), dogwoods (*Cornus racemosa*, *C. amomum*), Nine-bark (*Physocarpus opulifolius*), northern arrowwood (*Viburnum dentatum*), and spicebush (*Lindera benzoin*)



What You Can Do To Help

- Learn to identify the most invasive plants in your area.

European Privet

Ligustrum vulgare

Description

This shrub grows to a height and width of 12 to 15 feet. Leaves are opposite and nearly stalkless. Small white flowers grow in clusters at the end of stems. Fruits are small, shiny, blue-black berries.

Habitat

Privet can grow in bottomlands, mesic and riparian forests, old fields, closed canopy forests, glades and barrens, grasslands, roadsides, fence rows, and other areas with disturbed soil.

Ecological Threat

This aggressive invasive plant has been widely planted as hedges, but has escaped cultivation. Privet forms dense thickets, particularly in bottomland forests and along fencerows, thus gaining access to forests where it can outcompete native vegetation.

Management

Small plants can be dug up, and mowing and cutting may be appropriate for small populations. Herbicides may be necessary for larger populations. This shrub can be effectively controlled using several readily available herbicides including glyphosate, triclopyr, and metsulfuron methyl, which can be applied to leaves, basal bark, cut stems, or cut stumps.

Native Alternatives

Arrowwood (*Viburnum dentatum*), dogwoods (*Cornus* sp.), elderberry (*Sambucus canadensis*), and fragrant sumac (*Rhus aromatica*),



What You Can Do To Help

- *Be careful not to gather and transport unidentified seeds which may spread invasive plants.*

Garlic Mustard

Alliaria petiolata

Description

Garlic mustard is a biennial herb; it grows as a rosette of leaves in the first year and overwinters in this form. The plant's lifecycle ends in the second year when it flowers and sets fruits. First-year rosettes consist of kidney-shaped, garlic-smelling leaves; the second-year plant can grow multiple stems up to 4 feet tall with triangular, sharply-toothed leaves. The small, four-petaled flowers are white and grow in clusters at the top of the stem. Garlic mustard produces large quantities of seeds which can remain viable for seven years or more in the soil.

Habitat

This woodland plant prefers some shade but is occasionally found in full sun. It invades upland and floodplain forests, savannas, yards, streambanks, trails, and roadsides throughout West Virginia.

Ecological Threat

Garlic mustard threatens the abundant wildflowers and diverse forest ecosystems of West Virginia. Many native wildflowers that hikers enjoy seeing during the spring (such as spring beauty, wild ginger, bloodroot, Dutchman's breeches, trilliums, and toothworts) occur in the same habitat as garlic mustard. When garlic mustard is introduced to a new area, it outcompetes our native plants by aggressively monopolizing light, moisture, nutrients, soil, and space. It also produces compounds that inhibit the growth of other native plants. Many wildlife species that depend on spring native plants for their foliage, pollen, nectar, fruits, seeds, and roots are deprived of these essential food sources when garlic mustard becomes established. And, we are deprived of the vibrant display of beautiful spring wildflowers.

Management

Small infestations can be controlled by pulling up the second year plants in April or May, before they release seeds. Because the pulled stems can still produce viable seeds, they should be burned or disposed of in a landfill. Foliar application of herbicide usually is necessary for control of large infestations. Applications of glyphosate, triclopyr, or other systemic herbicides should be made in early spring or late fall to minimize damage to native plants. Regardless of the control method, follow-up treatment will be necessary for several years until the seed bank is exhausted.

Native Alternatives

Black cohosh (*Cimicifuga racemosa*), blue phlox (*Phlox divaricata*), columbine (*Aquilegia canadensis*), and white baneberry (*Actaea pachypoda*)



What You Can Do To Help

- Participate in weed pulls on public lands such as the annual "Garlic Mustard Challenge" hosted by the Monongahela National Forest.

Japanese Barberry

Berberis thunbergii

Description

This dense, spiny shrub grows 2-8 feet high. Branches are brown, deeply grooved, somewhat zig-zag in form bearing a single, very sharp spine at each node. Leaves are small and oval, or spatula-shaped with no serrations along the leaf margins. Small yellow flowers hang in umbrella-shaped clusters along the length of the stem. Berries are bright red and are borne on narrow stalks.

Habitat

Barberry is adaptable to a variety of open and wooded habitats, wetlands, and disturbed areas. The plant prefers to grow in full sun to part shade; however, it can fruit even in heavy shade.

Ecological Threat

Japanese barberry forms dense stands in natural habitats and alters soil pH, nitrogen levels, and biological activity in the soil. White-tailed deer avoid browsing barberry, apparently preferring to feed on native plants, giving barberry a competitive advantage. Barberry is also an alternate host for black stem rust, an important disease of wheat.

Management

Barberry can resprout from root fragments remaining in the soil, so thorough removal of root portions is important. Small plants can be pulled by hand, using thick gloves to avoid injury from spines. Hand-pulling or digging may need to be combined with herbicides to control large populations. For foliar applications spray leaves using a 2% solution of glyphosate or triclopyr, ensuring thorough coverage of foliage. Foliar treatment should be made either early in the spring as soon as barberry leafs out, or in late summer when plants are fruiting. Cut stumps should be sprayed with a 25% solution of glyphosate or triclopyr immediately after cutting. A native species of barberry occurs in West Virginia, so proper identification is necessary prior to control treatments.

Native Alternatives

Hobblebush (*Viburnum alnifolium*), hearts-a-bustin' (*Euonymus americana*), mountain laurel (*Kalmia latifolia*), and winterberry (*Ilex verticillata*)

What You Can Do To Help

- Plant native or non-invasive plants in your yard and garden.



Japanese Knotweed

Polygonum cuspidatum

Description

This shrub-like herb grows up to 10 feet tall. Stems are smooth and the pointed leaves vary from broadly oval to almost triangular. Flowers are greenish-white and very small. The seeds are dispersed by wind. Once established, the plants spread by a system of underground stems reaching 60 feet in length.

Habitat

Japanese knotweed can grow in a wide variety of habitats. It is found in open areas, such as roadsides, streambanks, and woodland edges or even in partial shade.

Ecological Threat

Japanese knotweed spreads quickly, forming dense thickets that exclude native vegetation. The plant poses a significant threat to riparian areas, where it can survive severe floods, and is able to rapidly colonize scoured shores. Japanese knotweed does not stabilize stream banks as well as native vegetation and large infestations can effect water quality and fish habitat.

Management

Knotweed is very difficult to control. Cutting alone is usually not effective. Small populations can be dug up, but any root fragments will resprout and could lead to an even larger patch. Leaves may be sprayed with a 2% solution of glyphosate or triclopyr. Stems can be cut and treated immediately with a 25% solution of glyphosate or triclopyr. Note that there are only certain herbicides, like Rodeo™ and Garlon 3A™, that are labeled for use around water. A combination method involves cutting the plants regularly during the summer (do not let them get over 2 feet tall) and applying a foliar spray in the fall. This helps to greatly reduce the root reserves and makes the herbicide much more effective. Cut stems should be left on-site or burned; even a small fragment can start a new infestation.

Native Alternatives

Black haw (*Viburnum prunifolium*), chokeberry (*Aronia prunifolia*, *A. melanocarpa*), dogwoods (*Cornus racemosa*, *C. amomum*), and northern arrowwood (*Viburnum dentatum*)



What Can You Do To Help

- *Become active in the Potomac Highlands Cooperative Weed and Pest Management Area.*

Japanese Stiltgrass

Microstegium vimineum

Description

Stiltgrass is an annual grass with pale green, lance-shaped, asymmetrical leaves. Each leaf has a distinctive shiny midrib on the upper surface which distinguishes it from native grasses.

Habitat

Stiltgrass occurs in a wide variety of habitats throughout the state in moist forests, riparian areas, and roadsides. It readily invades areas subject to regular mowing, tilling, foot traffic, flooding, and other soil disturbing activities.

Ecological Threat

This species is especially well adapted to low light conditions. Stiltgrass threatens native plants and natural habitats in open to shady, and moist to well-drained locations. This grass forms dense, monotypic stands that exclude most other vegetation. The structural alterations of forest floor vegetation in stiltgrass invasions may be detrimental to ground nesting birds. Where white-tailed deer are overabundant, they may assist the spread of stiltgrass by feeding on native plant species and avoiding stiltgrass. Deer can also spread seeds with their hooves and fur.

Management

A variety of control methods are available for stiltgrass. Preventing the introduction of this species into new areas should be a priority. Manual removal of plants results in disturbance to the soil which can result in additional germination of stiltgrass seed. Using herbicide leaves the plants and soil in place, thus minimizing the likelihood of spreading seed. Glyphosate has been shown to be effective in a 2% solution. Grass-specific herbicides such as sethoxydim and fluazifop are effective and should not harm broadleaf vegetation. Mowing the plants very close to the ground in late summer, just prior to seed production, can also be effective. All treatments will have to be repeated annually until the seed bank is exhausted.

Native Alternatives

Big bluestem (*Andropogon gerardii*), bottlebrush grass (*Elymus hystix*), little bluestem (*Schizachyrium scoparium*), Virginia rye (*Elymus virginicus*), and white grass (*Leersia virginica*)

What You Can Do To Help

- *Read the label! Be careful when planting seed mixes. Non-native invasive species may be in the mix.*



Kudzu

Pueraria montana

Description

Kudzu is a climbing, semi-woody vine that grows under a wide range of conditions in most soil types. Leaves are alternate and compound, with three broad leaflets. Leaflets may be smooth or deeply 2-3 lobed with hairy margins. The highly fragrant purple flowers are small and borne in long hanging clusters.

Habitat

Kudzu prefers to grow in locations where sunlight is abundant such as forest edges, abandoned fields, roadsides, and disturbed areas.

Ecological Threat

Kudzu kills or degrades other plants by smothering them under a solid blanket of leaves, by girdling woody stems and tree trunks, and by breaking branches or uprooting entire trees and shrubs through the sheer force of its weight. Once established, Kudzu plants grow rapidly, extending as much as 60 feet per season at a rate of about one foot per day.

Management

For successful long-term control of kudzu, the extensive root system must be destroyed. Mowing and cutting vines may need to be combined with immediate application of herbicides to control this species. Picloram is commonly recommended to control kudzu, however it is a restricted use herbicide (i.e. it requires an applicators license). Foliar treatments can be made with dicamba, 2,4-D, glyphosate, triclopyr, metsulfuron methyl, picloram, or clopyralid. For climbing vines, cut a section out near the ground and then brush on a 25% solution of either glyphosate or triclopyr. The rest of the area should be foliar treated (i.e. spray the leaves) using one of the above herbicides. Repeat applications will likely be required as new leaves emerge. Fall treatments are generally recommended because this timing helps get more herbicide into the root system.

Native Alternatives

Native bittersweet (*Celastrus scandens*), trumpet creeper (*Campsis radicans*), and Virginia creeper (*Parthenocissus quinquefolia*)



What You Can Do To Help

- *Start early! Early detection and control makes eradication efforts much easier.*

Mile-A-Minute

Persicaria perfoliata

Description

Mile-a-minute is an annual, trailing vine that varies in height depending on where it is growing. In open areas, it forms dense mats that cover everything, including small trees and shrubs. At forest edges, plants climb on other vegetation reaching up to 26 feet in height. The light green, triangular leaves alternate along the narrow, delicate stems. The leaf blades and stems are armed with recurved barbs. Distinctive circular, cup-shaped leafy structures, called ocreae, surround the stem at nodes. Flower and fruits emerge from within the ocreae. While the flowers of this plant are small, white, and generally inconspicuous, the fruits are attractive, deep blue, and arranged in clusters.

Habitat

Mile-a-minute generally colonizes disturbed sites and open areas, wetlands, forest edges, stream banks, roadsides, and open fields. Although it can tolerate partial shade, mile-a-minute does best in full sunlight, often using its ability to attach to other plants to climb up to higher light levels. Mile-a-minute prefers moist soils, but it can survive in relatively dry areas.

Ecological Threat

Mile-a-minute grows rapidly, out-competing native species by blocking available light. This plant infests nurseries, orchards, openings in forested areas, roadside, and drainage ditches. Plant diversity is greatly reduced in these areas, and wildlife is affected by diminished food and habitat sources. Mile-a-minute is particularly threatening to forest regeneration because it can smother tree seedlings.

Management

A variety of control measures can be used to manage mile-a-minute. Because of its relatively weak root system, hand pulling is useful for small infestations. Hand pulling of seedlings is easiest if done before the recurved barbs on the stem and leaves harden. If done afterwards, thick gloves, long pants, and a long-sleeved shirt should be worn. For low growing infestations that cover the ground, repeated mowing or weed whipping can be effective. For most situations, treatment with either triclopyr or glyphosate is the best choice. A small weevil, *Rhinoncomimus latipes* Korotyaev, has been found to be host-specific to mile-a-minute. Adult weevils feed on mile-a-minute foliage, and larvae feed within nodes and can suppress growth and reduce seed production. Weevils have been released by the West Virginia Department of Agriculture.

Native Alternatives

Dutchman's pipe vine (*Aristolochia macrophylla*) and Virginia creeper (*Parthenocissus quinquefolia*)

What You Can Do To Help

- Talk to your neighbors, local groups, or your community about non-native invasive plants.



Purple Loosestrife

Lythrum salicaria

Description

This popular garden flower grows 3-7 feet tall and has a dense bushy growth of one to 50 stems. Long spikes of flowers are purple to magenta, and linear-shaped leaves grow opposite along the square stems. Purple loosestrife spreads aggressively by underground stems (rhizomes) and can produce over a million seeds per plant. *Lythrum virgatum*, a popular horticultural variety, was initially thought to be unable to produce seeds. Research has shown that it can cross-pollinate with *Lythrum salicaria* and produce viable seeds of invasive loosestrife.

Habitat

Purple loosestrife grows in a variety of wetland habitats including marshes, river banks, ditches, wet meadows, and edges of water bodies.

Ecological Threat

Loosestrife can invade both natural and disturbed wetlands, replacing native vegetation with nearly pure stands of loosestrife. As this plant establishes and spreads, it outcompetes and replaces native grasses, sedges, and other flowering plants that provide a higher quality of nutrition for wildlife.

Management

Small stands of purple loosestrife can be controlled by hand-pulling, digging, or applying systemic herbicides to the foliage. Herbicides, such as glyphosate, triclopyr, dicamba, or 2,4-D, may be used to control large populations. Note that there are only certain herbicides that are labeled for use around water. The West Virginia Department of Agriculture has used biological control (beetle releases) in the past and is making plans for additional releases.

Native Alternatives

Blue lobelia (*Lobelia siphilitica*), cardinal flower (*Lobelia cardinalis*), rose mallow (*Hibiscus moscheutos*), and spiked blazing-star (*Liatris spicata*)



What You Can Do To Help

- Encourage nurseries to avoid selling invasive non-native plants and to stock alternative native or non-invasive plant species.

Tree of Heaven

Ailanthus altissima

Description

Tree of heaven is a rapidly growing, deciduous tree reaching up to 80 feet or more in height. Leaves are compound and composed of 11-25 smaller leaflets that are entire except for one to several broad, rounded teeth at the base. The underside of each leaflet also has a round, thickened spot (a gland) near the base of each tooth. This tree has clusters of small, yellow-green flowers near the tips of branches. All parts of the tree, especially the flowers, have a strong, unpleasant odor when crushed or bruised.

Habitat

Tree of heaven grows almost anywhere including disturbed forests, forest edges roadsides, and urban areas.

Ecological Threat

Tree of heaven is a prolific seed producer. A single tree can make up to 350,000 seeds a year. Once established, it can quickly take over a site and form an impenetrable thicket that reduces the light available to plants growing beneath. Tree of heaven also releases chemicals into the soil that inhibit growth of other plants.

Human Threat

Sap is toxic and can be absorbed through the skin. It causes potentially dangerous inflammation of the lining around the heart. Therefore, it is important to wear gloves and protective clothing when cutting tree of heaven.

Management

The most effective method of control for this species seems to be through the use of herbicides, which can be applied to leaves, basal bark, cut stems, or cut stumps. Apply foliar treatments to seedlings using a 2% solution of glyphosate or triclopyr when trees are in full leaf. Basal bark treatment using a 20% solution of triclopyr in horticultural oil can be applied during the winter, limiting damage to non-target species. Hack-and-squirt treatment requires a series of cuts (1 per inch of diameter plus 1) to be made in the stem/trunk with a hatchet. Concentrated water soluble triclopyr is immediately squirted into these cuts using a spray bottle. Glyphosate is most effective as a foliar treatment, but inconsistent as a hack-and-squirt or stump treatment. Remember that it is relatively easy to kill the aboveground portion of tree of heaven, but you also need to kill or seriously damage the root system to prevent or limit stump sprouting and root suckering.

Look-alikes

It is important not to confuse native shrubs and trees with tree of heaven. Native sumacs (*Rhus*) and trees like ash (*Fraxinus*) and hickory (*Carya*) can be distinguished from tree-of-heaven by having completely serrated (toothed) leaf margins. The simplest characteristic that distinguishes tree-of-heaven from these species is its distinctive and unpleasant odor.

Native Alternatives

Ash Trees (*Fraxinus spp.*), Black walnut (*Juglans nigra*), Butternut (*Juglans cinerea*), and native Sumacs (*Rhus sp.*)



Herbicide Names* and Uses

Brand Name	Generic Name	Application	Brand Name	Generic Name	Application
Weedone 650	2,4-D	Broadleaf weeds. For terrestrial use only.	Poast	Sethoxydim	Selective for control of annual and perennial grass. For terrestrial use only.
Weedone LV4 EC	2,4-D	Broadleaf weeds and brush. For terrestrial use only.	Garlon 3A	Triclopyr	Woody plant and broadleaf weeds. For use in and around aquatic sites.
Tordon 101	2,4-D + picloram	Broadleaf weeds, woody plants, and vines. For terrestrial use only	Garlon 4	Triclopyr	Woody plants and annual and perennial broadleaf weed. For terrestrial use only.
Transline	Clopyralid	Broadleaf weed and brush. For terrestrial use only	Tordon K	Picloram	Annual and perennial broadleaf weeds, woody plants, and vines. For terrestrial use only.
Fusilade	Fluazifop	Perennial and annual grass weeds. For terrestrial use only.	Tordon 22K	Picloram	Broadleaf weeds, woody plants, and vines. For terrestrial use only.
Plateau	Imazapic	Annual and perennial grasses and broadleaf weeds. For terrestrial use only.			
Arsenal	Imazapyr	Vegetation on forestry sites. For terrestrial use only.			
Escort	Metsulfuron methyl	Annual and perennial weeds and unwanted woody plants. For terrestrial use only.			
Accord	Glyphosate	Annual and perennial weeds and woody plants. For use in and around aquatic sites.			
Roundup	Glyphosate	Annual weeds, perennial weeds, woody brush, and trees. Cannot be used over water.			

**Use of brand names does not imply endorsement of the products named or criticism of similar ones not mentioned.*